

AMENDMENTS TO THE CLAIMS

Please amend claims 88, 89, 97, 101, 102, 104, 114-118, 120-124 and 125 follows.

Claims 1-87 (Cancelled)

88. (Currently amended) A tunable optical filter apparatus, comprising:

a grid generator to be positioned in an optical path of an optical signal and to generate a first plurality of transmission peaks at respective wavelengths corresponding to optical communication channels within a selected wavelength range of a gain medium optically coupled to the tunable optical filter; and

a channel selector to be positioned in said optical path to be optically coupled to the grid generator and to generate a second plurality of transmission peaks at respective wavelengths within said wavelength range, said channel selector including means for tuning to tune the second plurality of transmission peaks relative to the first set plurality of transmission peaks such that a single pair of respective transmission peaks from among the first and second plurality of transmission peaks having a common wavelength may be aligned,

wherein the second plurality of transmission peaks to have one more or one fewer peaks than the first plurality of transmission peaks within said wavelength range.

89. (Currently amended) The apparatus of claim [[89]] 88, wherein said grid generator has a first free spectral range and said channel selector has a second free spectral range different from said first free spectral range, and wherein tuning is effectuated by shifting the second plurality of transmission peaks relative to the first plurality of transmission peaks to align one of the transmission peaks from the second plurality of transmission peaks with a

42P14868

Serial No. 09/626,526

Reply to Final Office Action of April 28, 2004

- 2 -

Examiner: Jackson, C.
Art Unit: 2828

transmission peak from the first plurality of transmission peaks having a wavelength corresponding to a selected optical communication channel.

90. (Cancelled)

91. (Previously presented) The apparatus of claim 88, wherein at least one of said grid generator and said channel selector is configured to operate in transmission.

92. (Previously presented) The apparatus of claim 88, wherein at least one of said grid generator and said channel selector is configured to operate in reflection.

Claims 93-96 (Cancelled)

97. (Currently amended) A method for tuning an optical beam, comprising:
generating a first plurality of transmission peaks having respective wavelengths corresponding to channels within a selected wavelength range of a laser, the laser to generate the optical beam;
generating a second plurality of transmission peaks having respective wavelengths within said selected wavelength range; and
tuning said second plurality of transmission peaks with respect to said first plurality of transmission peaks to tune said optical beam to a selected channel by aligning one of the second plurality of transmission peaks with one of the first plurality of transmission peaks corresponding to the selected channel,
wherein the second plurality of transmission peaks to have one more or one fewer peaks than the first plurality of transmission peaks within said wavelength range.

42P14868
Serial No. 09/626,526
Reply to Final Office Action of April 28, 2004

- 3 -

Examiner: Jackson, C.
Art Unit: 2828

98. (Previously presented) The method of claim 97, wherein:

generating said first plurality of transmission peaks comprises positioning a grid generator having a first free spectral range in said optical beam; and
generating said second plurality of transmission peaks comprises positioning a channel selector having a second free spectral range in said optical beam.

99. (Previously presented) The method of claim 98, wherein tuning said second plurality of transmission peaks with respect to said first plurality of transmission peaks comprises adjusting said second free spectral range with respect to said first spectral range.

Claim 100 (Cancelled)

101. (Currently amended) A tunable optical filter apparatus for filtering an optical beam generated by a gain medium, comprising:

grid means for generating a first plurality of transmission peaks having respective wavelengths corresponding to channels in a selected wavelength range of the gain medium, said grid means to be positioned in an optical path for said optical beam; and

channel selector means for generating a second plurality of transmission peaks having respective wavelengths in the wavelength range, said channel selector means to be positioned in said optical path to be optically coupled to the grid means and to tune the optical beam by aligning one of the second plurality of transmission peaks with one of the first plurality of transmission peaks,

42P14868

Serial No. 09/626,526

Reply to Final Office Action of April 28, 2004

- 4 -

Examiner: Jackson, C.

Art Unit: 2828

wherein the second plurality of transmission peaks to have one more or one fewer peaks than the first plurality of transmission peaks within said wavelength range.

102. (Currently amended) The apparatus of claim 88, wherein the first plurality of transmission peaks have a constant free spectrum spectral range and the second plurality of transmission peaks have a variable free spectrum spectral range and tuning is effectuated by adjusting the variable free spectrum spectral range of the second plurality of transmission peaks to align one of the transmission peaks from the second plurality of transmission peaks with a transmission peak from the first plurality of transmission peaks having a wavelength corresponding to a selected channel.

103. (Previously presented) The apparatus of claim 88, wherein tuning said second plurality of transmission peaks with respect to said first plurality of transmission peaks comprises shifting said second plurality of transmission peaks relative to said first plurality of transmission peaks.

104. (Currently amended) The apparatus of claim 88, wherein the grid generator defines a first optical path length determinative of a first free spectral range substantially corresponding to a spacing between adjacent gridlines of the a selected wavelength grid within the wavelength range.

105. (Previously presented) The apparatus of claim 104, wherein the channel selector defines a second tunable optical path length determinative of a second tunable free spectral range which differs from the first free spectral range of the grid generator by an amount substantially equal to the quotient of the first free spectral range divided by one of a number

42P14868

Serial No. 09/626,526

Reply to Final Office Action of April 28, 2004

- 5 -

Examiner: Jackson, C.

Art Unit: 2828

of channels of the selected wavelength grid or the quotient of the first free spectral range divided by a subset of the number of channels of the selected wavelength grid.

106. (Previously presented) The apparatus of claim 88, wherein the grid generator and the channel selector comprise at least one of: a Fabry-Perot filter, a diffraction element, and an interference element.

107. (Previously presented) The apparatus of claim 88, wherein the channel selector includes at least one of: a Pockels cell, a Kerr cell, a solid etalon, a gap etalon, and a wedge-shaped etalon.

108. (Previously presented) The apparatus of claim 88, wherein the channel selector includes at least one of a tunable length and a tunable index of refraction.

109. (Previously presented) The apparatus of claim 88, wherein the tuning of the channel selector is effected by one of: a mechanical actuator, a thermal actuator, an electro-optical actuator, and a pressure actuator to tune the second plurality of transmission peaks.

110. (Previously presented) The apparatus of claim 88, wherein the channel selector comprises:

a gas spaced etalon tunable by adjusting a pressure of a gas within the etalon to vary an optical path length thereof.

111. (Previously presented) The apparatus of claim 88, wherein the channel selector comprises:

an etalon responsive to an applied electric field to vary an optical path length thereof.

42P14868

Serial No. 09/626,526

Reply to Final Office Action of April 28, 2004

- 6 -

Examiner: Jackson, C.

Art Unit: 2828

112. (Previously presented) The apparatus of claim 88, wherein the channel selector comprises:

an etalon responsive to an applied thermal energy to vary an optical path length thereof.

113. (Previously presented) The apparatus of claim 108, wherein the channel selector comprises:

a semiconductor element with a tunable index of refraction responsive to an applied electric field or current to vary an optical path length thereof.

114. (Currently amended) The apparatus of claim 88, wherein the channel selector comprises:

a grating; and

an actuator for varying an angle between the grating and the optical beam to tune the optical beam to selected optical communication channels of the wavelength grid range.

115. (Currently amended) The tunable laser of claim 88, wherein the grid generator comprises:

an etalon; and

a thermal controller to control a temperature of the etalon to maintain the substantial alignment of the first set plurality of transmission peaks with the corresponding optical communication channels of the selected wavelength grid range.

116. (Currently amended) A method for tuning an optical beam of a laser, comprising:

42P14868
Serial No. 09/626,526
Reply to Final Office Action of April 28, 2004

- 7 -

Examiner: Jackson, C.
Art Unit: 2828

filtering the optical beam to define a first plurality of pass bands substantially aligned with corresponding channels in a selected wavelength grid, the selected wavelength grid having a wavelength range within a wavelength range of the laser;

filtering the optical beam to define a second plurality of pass bands within the selected wavelength grid; and

tuning the second plurality of pass bands with respect to the first plurality of pass bands to select channels at which to tune the optical beam, wherein the optical beam is tuned to a channel when one of the pass bands in the second plurality of pass bands is aligned with a pass band in the first plurality of pass bands corresponding to a selected channel,

wherein the second plurality of transmission peaks pass bands to have one more or one fewer peaks pass bands than the first plurality of transmission peaks pass bands within said wavelength range the selected wavelength grid.

117. (Currently amended) The method of claim 116, further comprising:

emitting the optical beam via a gain medium of the laser; and

optically providing feedback to the gain medium corresponding to the pass bands of the first and second plurality of pass bands that are aligned.

118. (Currently amended) The method of claim 116, wherein the tuning further comprises:

shifting the second set plurality of pass bands across a wavelength range substantially equal to one channel spacing within the wavelength grid to tune channels throughout the selected wavelength grid.

119. (Previously presented) The method of claim 116, wherein the tuning further comprises:

42P14868

Serial No. 09/626,526

Reply to Final Office Action of April 28, 2004

- 8 -

Examiner: Jackson, C.
Art Unit: 2828

defining selectable channels by selecting either subsets of channels throughout the wavelength grid or discrete channels throughout the wavelength grid.

120. (Currently amended) The method of claim 116, wherein the filtering the optical beam to define a first set plurality of pass bands comprises:

generating a first interference within the optical beam with a first free spectral range subsequently corresponding to a wavelength spacing for the selected wavelength grid.

121. (Currently amended) The method of Claim 120, wherein the filtering the optical beam to define a second set plurality of pass bands comprises:

generating a second interference within the optical beam with a second free spectral range which differs from the first free spectral range by an amount substantially equal to the quotient of the first free spectral range divided by one of a number of channels of the selected wavelength grid or the quotient of the first free spectral range divided by a subset of the number of channels of the selected wavelength grid.

122. (Currently amended) The method of claim 116, wherein the first plurality of pass bands have transmission peaks defining a first free spectrum spectral range and the second plurality of pass bands have transmission peaks defining a second free spectrum spectral range and tuning is accomplished by shifting the second plurality of pass bands relative to the first plurality of pass bands to align one of the transmission peaks from the second plurality of pass bands with a transmission peak from the first plurality of pass band having a wavelength corresponding to the selected channel.

123. (Currently amended) The method of claim 116, wherein the first plurality of pass bands have transmission peaks defining a first constant free spectrum spectral range and the

42P14868

Serial No. 09/626,526

Reply to Final Office Action of April 28, 2004

- 9 -

Examiner: Jackson, C.

Art Unit: 2828

second plurality of pass bands have transmission peaks defining a second free spectrum spectral range that may be varied, and tuning is accomplished by adjusting the second free spectrum spectral range to align one of the transmission peaks from the second plurality of pass bands with a transmission peak from the first plurality of pass bands having a wavelength corresponding to the selected channel.

124. (Currently amended) The apparatus of claim 101, wherein the first plurality of transmission peaks have a first free spectrum spectral range and the second plurality of transmission peaks have a second free spectrum spectral range and the channel selector means includes:

means for shifting the second plurality of transmission peaks relative to the first plurality of transmission peaks to align one of the transmission peaks from the second plurality of pass-bands transmission peaks with a transmission peak from the first plurality of pass-bands transmission peaks having a wavelength corresponding to a selected channel.

125. (Currently amended) The apparatus of claim 101, wherein the first plurality of transmission peaks have a first constant free spectrum spectral range and the second plurality of transmission have a second free spectrum spectral range that may be varied, and the channel selection selector means includes:

means for adjusting the second free spectrum spectral range to align one of the transmission peaks from the second plurality of transmission peaks with a transmission peak from the first plurality of transmission peaks having a wavelength corresponding to a selected channel.

Claims 126-128 (Cancelled)

42P14868

Serial No. 09/626,526

Reply to Final Office Action of April 28, 2004

- 10 -

Examiner: Jackson, C.

Art Unit: 2828